REMARKS

Reconsideration and the timely allowance of the pending claims, in view of the following remarks, are respectfully requested.

In the Office Action of September 25, 2006, the Examiner rejected claims 1-2, 4-7, and 19-17, under 35 U.S.C. §103(a), as allegedly being unpatentable over Machino '398 (U.S. Patent No. 6,855,398) in view of Dopico '829 (WO 01/63829).

By this Amendment, claims 1-2, 5, 9, and 10-16 have been amended to provide a clearer presentation of the claimed subject matter and claims 4 and 6-7 have been cancelled without prejudice or disclaimer. Applicant submits that no new matter has been introduced.

Insofar as the 35 U.S.C. §103(a) rejections are still relevant in view of the claim changes, Applicant respectfully traverses the prior art rejections, for the following reasons:

I. Prior Art Rejections Under §103(a).

As indicated above, independent claim 1, now positively recites, *inter alia*, that the silicone compound has at least one functional group selected from the group consisting of a halogen atom, a hydroxyl group, and an alkoxy group, and that a proportion of the fire resistant agent is 1 to 30 parts by weight relative to 100 parts by weight of the carbon fiber and 1 to 70 parts by weight relative to 100 parts by weight of the binder resin, respectively. The features are amply supported by the embodiments disclosed in the written description.

Applicant submits that, in contrast to the Examiner's assertions, the applied references fail to teach each and every element of claim 1, including the features noted above.

In particular, the Machino '398 reference is directed to a thermal-acoustic insulation material comprising a wool-like carbon fiber aggregate composed of carbon fibers having an average fiber diameter of 0.5 μm to 5 μm and an average fiber length of 1 mm to 15 mm, and wherein said fibers are bonded together by a thermosetting resin. (*See*, Machino '398: col. 21, lines 24-31). As such, Machino '398 discloses that anisotropic pitch obtained by polymerizing condensed polycyclic hydrocarbon should be employed as a material of the carbon fiber precursors in view of the elongation(toughness) of the carbon fibers and the tensile strength of the CF thermal- acoustic insulation material produced from the precursors. (*See*, Machino

'398: col. 9, lines 36-43). Machino '398 also discloses that among the thermosetting resins which may be employed in the aforementioned step are, for example, phenolic resins, melamine resins and silicone resins. The amount to be used is normally 10 wt.% to 40 wt.% to the CF thermal-acoustic insulation material, or more preferably 20 wt.% to30 wt.%. (*See*, Machino '398: col. 17, lines 20-24). Machino '398 also concludes that the bulk density of a CF thermal-acoustic insulation material should preferably be 3 kg/m^3 to 10 kg/m^3. (*See*, Machino '398: col. 12, lines 3-5).

Despite these comprehensive disclosures, Machino '398 clearly fails to teach or suggest the fire resistant agent comprising a combination of a silicone compound having the specific functional group and an inorganic oxide as well as the specific proportion of the fire resistant agent relative to the carbon fiber or the binder resin, as required by claim 1. In particular, Machino '398 fails to disclose the fire resistant agent and, although Machino '398 does disclose glass fiber as an inorganic compound, the glass fiber is merely characterized as an optional other fiber, on the same level as the polyester resin and other alternatives. There is absolutely nothing in Machino '398 that suggests contemplating the improvement of fire resistant properties by adding the fire resistant agent.

Moreover, not only does Machino '398 fail to disclose the combination of the silicone compound and the inorganic compound, it is absolutely devoid of teaching that the proportion of the fire resistant agent is 1 to 30 parts by weight relative to 100 parts by weight of the carbon fiber and 1 to 70 parts by weight relative to 100 parts by weight of the binder resin, as required by claim 1. At best, Machino '398 merely suggests, and does so indirectly, that carbon fiber may be main component.

Applicant also submits that Dopico '829 fails to cure the deficiencies noted above relative to Machino '398 and fails in its own right to teach each and every claimed feature. That is, Dopico '829 is directed to improving the toughness of phenolic resins without decreasing fire-resistance properties of composites. (*See*, Dopico '829: page 2, lines 10-11). As such, Dopico '829 discloses the process of preparing an epoxy-functional polysiloxane modified phenolic resin comprising reacting phenol with epoxy-functional polysiloxane to open the epoxy ring and form a C-O-C ether linkage between the phenol and the silicone molecule, forming an epoxy-functional polysiloxane-modified phenol and then adding formaldehyde and reacting with excess phenol to form a phenolic resole resin. (*See*, Dopico '829: page 4, lines 5-18).

Dopico '829 further discloses that resulting compositions may be used to impregnate a variety of substrates, such as, but not limited to paper, glass roving or mat, carbon fiber, aramid fibers, kevlar, and nomex honeycomb. (*See*, Dopico '829: page 3, lines 3-5). Also, Dopico '829 provides that the range for the amount of resin to be added to the substrate in the practice of the invention varies based on the process used. Generally, the weight range is from about 1 to about 100 parts of resin per 100 parts of substrate. The preferred weight range again varies from process to process, but it is typically in the range of about 10 to about 50 parts of resin per 100 parts of substrate. (*See*, Dopico '829: page 14, lines 16-20)

In so doing, Dopico '829, like Machino '398, fails to teach or suggest the use of the fire resistant agent comprising a combination of a silicone compound having the specific functional group and an inorganic oxide as well as the specific proportion of the fire resistant agent relative to the carbon fiber or the binder resin, as required by claim 1. That is, while Dopico '829 discloses the polysiloxane modified phenolic resin, it remains silent as to the silicone compound being an independent compound. And, in the epoxy-functional polysiloxane modified phenolic resin of Dopico '829, the epoxy group of the polysiloxane, reacts with a phenol to open the epoxy ring and form a C-O-C ether linkage between the phenol and the silicone molecule, so that the epoxy-functional polysiloxane modified phenolic resin fails to have the epoxy groups as the functional groups.

And again, like Machino '398, Dopico '829 is absolutely silent regarding the proportion of the fire resistant agent is 1 to 30 parts by weight relative to 100 parts by weight of the carbon fiber and 1 to 70 parts by weight relative to 100 parts by weight of the binder resin, as required by claim 1.

As further evidence of patentability, Applicant submits that the present claimed invention provides unexpected advantages relative to fire resistance. For example, because the material of Machino '398 comprises a wool-like carbon fiber aggregate and the thermosetting resin, the material corresponds to Comparative Examples 1 and 2 of the present specification. As will be apparent from the results of Tables 1 and 2 of the present specification, such materials do not provide sufficient fire resistance (*e.g.*, 2 or 6 minutes).

Similarly, the material Dopico '829 comprises an epoxy-functional polysiloxane modified phenolic resin and the carbon fiber, in which the fire resistance of the material cannot be improved. Further, the epoxy ring of the phenolic resin of Dopico '829 is opened,

and thus the polysiloxane modified phenolio resin of Dopico '829 has no functional groups. Accordingly, the polysiloxane modified phenolic resin of Dopico '829 cannot be improved the cross-linkable property to the carbon fiber (the adhesion property with the carbon fiber).

With this said, because the carbon fiber felt of the present invention comprises the specific silicone compound and the inorganic oxide in the specific proportion relative to the carbon fiber and the binder resin, the felt fire resistance can be significantly improved. Such effect is apparent from the results of Examples 10-15 on Table 4 that the carbon fiber felt has high fire resistance (*e.g.*, 8-10 minutes). Also, because the present silicone compound has the specific functional group, the silicone compound can be improved the adhesion property with the carbon fiber. (*See*, Specification: page 13, lines 15-19). As the result, the felt can be improved in fire resistance in addition to a mechanical property and durability.

It should be appreciated that these advantages would never be predicted or otherwise suggested from the references.

Thus, for at least these reasons, Applicant submits that neither Machino '398 nor Dopico '829 are incapable of rendering claim 1 unpatentable. As such, claim 1 is clearly patentable. And, because claims 2, 5, and 9-17, depend, either directly or indirectly, from claim 1, claims 2, 5, and 9-17 are patentable at least by virtue of dependency as well as for their additional recitations. Accordingly, the immediate withdrawal of the prior art rejections of claims 1, 2, 5, and 9-17 is respectfully requested.

II. Conclusion.

All matters shaving been addressed and in view of the foregoing, Applicant respectfully request the entry of this Amendment, the Examiner's reconsideration of this application, and the immediate allowance of all pending claims.

Applicants' Counsel remains ready to assist the Examiner in any way to facilitate and expedite the prosecution of this matter. If any point remains in issue in which the Examiner feels may be best resolved through a personal or telephone interview, please contact the Undersigned at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number **03-3975**. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

E. RICO HERNANDEZ
Reg. No. **47,641**
Tel. No. 703.770.7788
Fax No. 703.770.7901

Date: December 26, 2006
P.O. Box 10500
McLean, VA 22102
703.770.7900